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Oe

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(54) **PRINTER WITH TRANSFER BELT AND SHEET PRESSING ROLLER**

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B41J 11/00 (2006.01)

(52) **U.S. Cl.**
CPC ***B41J 11/0085*** (2013.01); ***B41J 11/005*** (2013.01); ***B41J 11/007*** (2013.01)

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USPC 347/8, 16, 104
See application file for complete search history.

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(57) **ABSTRACT**

A printer is provided with a transfer belt, a sucking fan, a printing portion, and an inter-head guide roller. The printing portion has a head row and a head holder. The inter-head guide roller is rotatably supported by a pair of support portions fixedly arranged on the head holder on one end side and the other end side of the inter-head guide roller. A plurality of belt holes is arranged on the transfer belt so that the plurality of belt holes passes just below each support portion when the transfer belt is moving.

7 Claims, 5 Drawing Sheets

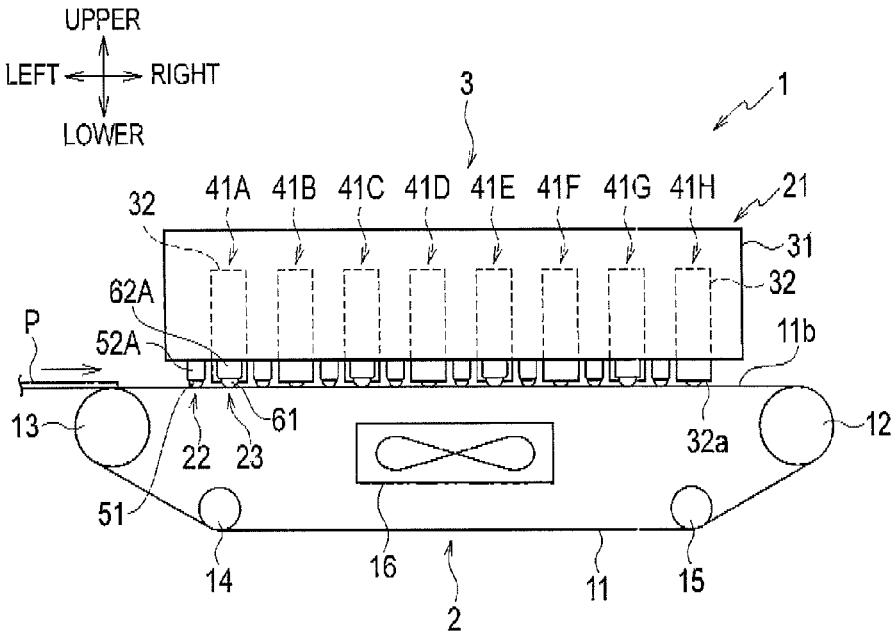


FIG. 1

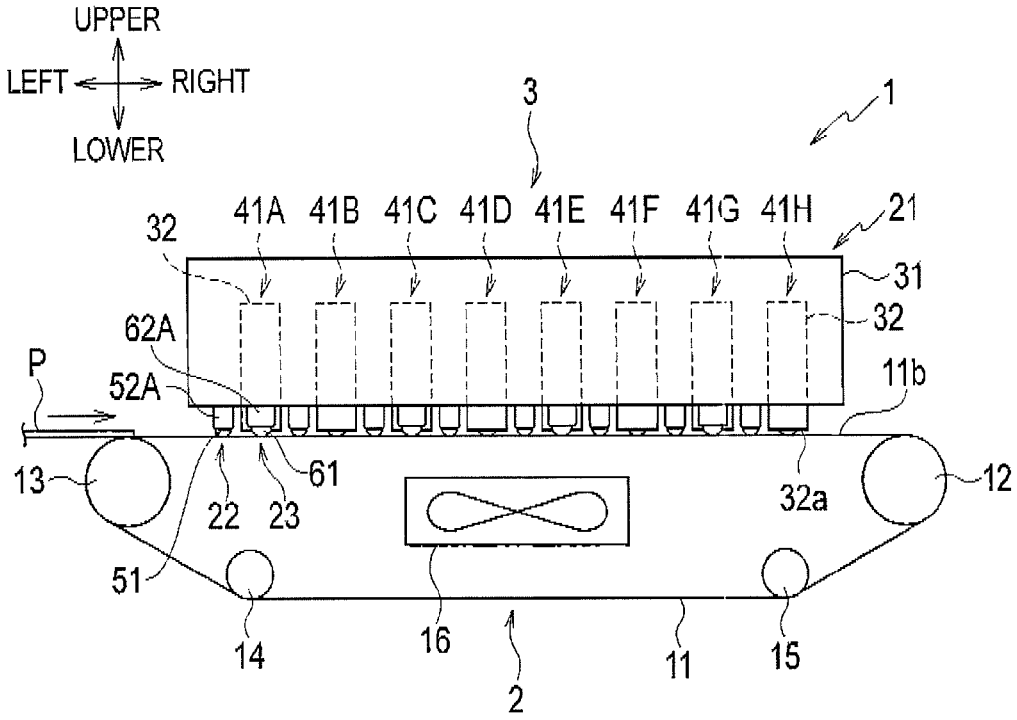
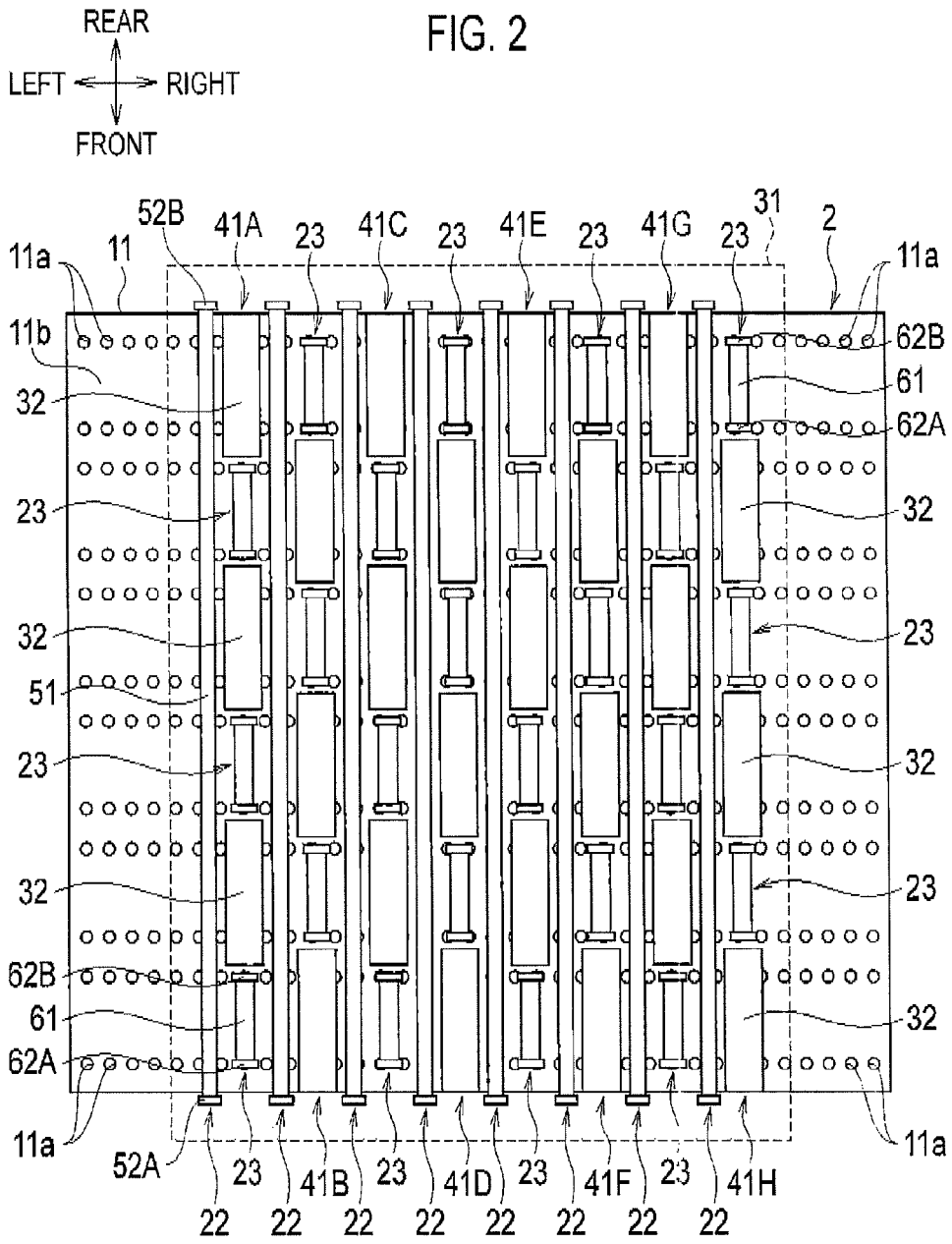

UPPER
LEFT
RIGHT
LOWER
3
1
41A
41B
41C
41D
41E
41F
41G
41H
21
32
31
32
62A
52A
P
11b
13
22
23
61
32a
12
51
14
16
11
15
2

FIG. 2


REAR
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52B
41A
23
41C
23
41E
23
41G
23
31
2
11a
11
11a
11b
62B
61
62A
32
23
32
23
51
32
23
32
62B
61
62A
11a
52A
23
41B
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41D
23
41F
23
41H
11a
22
22
22
22
22
22
22
22

FIG. 3

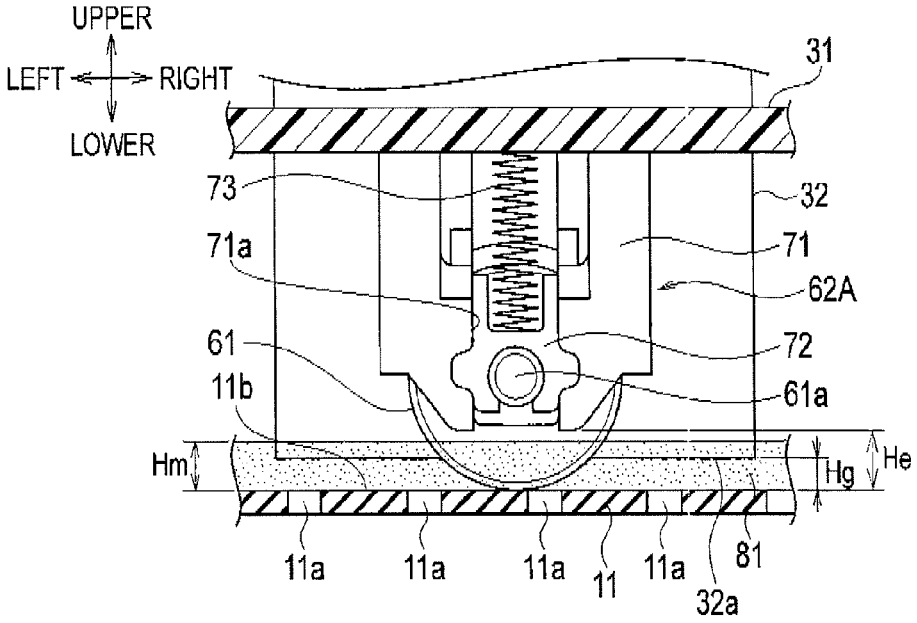
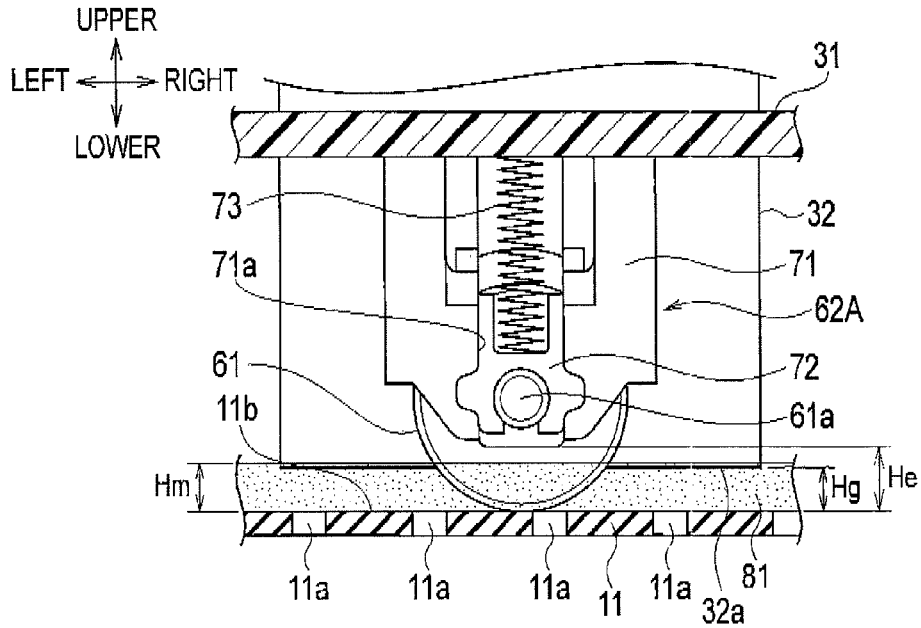

UPPER
LEFT
RIGHT
LOWER
31
73
32
71a
71
62A
61
72
11b
61a
Hm
Hg
He
11a
11a
11a
11
11a
81
32a

FIG. 4


UPPER
LEFT
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LOWER
31
73
32
71a
71
62A
61
72
11b
61a
Hm
Hg
He
11a
11a
11a
11
11a
81
32a

FIG. 5

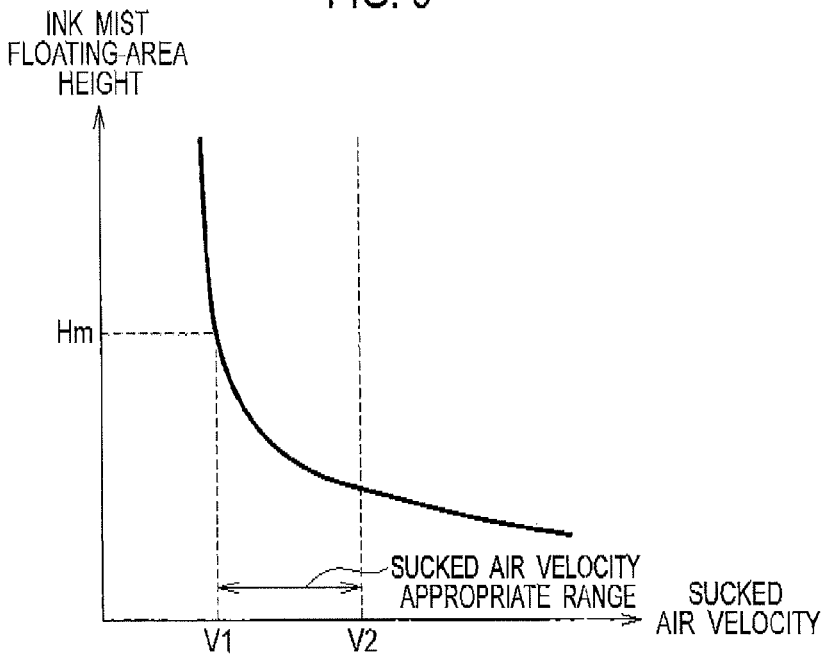

INK MIST
FLOATING-AREA
HEIGHT
Hm
SUCKED AIR VELOCITY
APPROPRIATE RANGE
SUCKED
AIR VELOCITY
V1
V2

FIG. 6

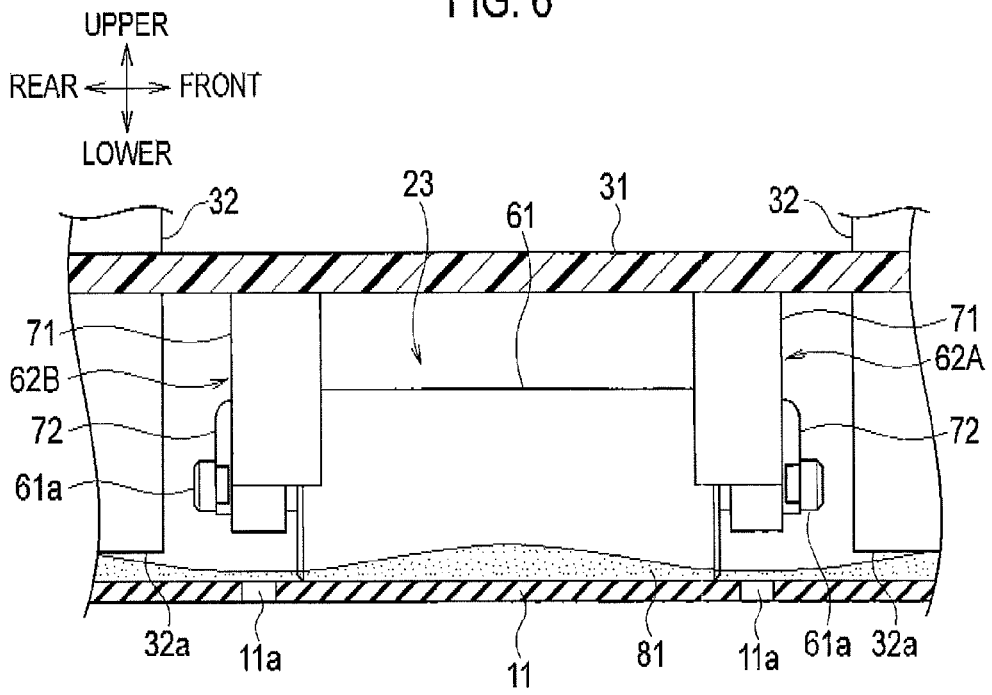
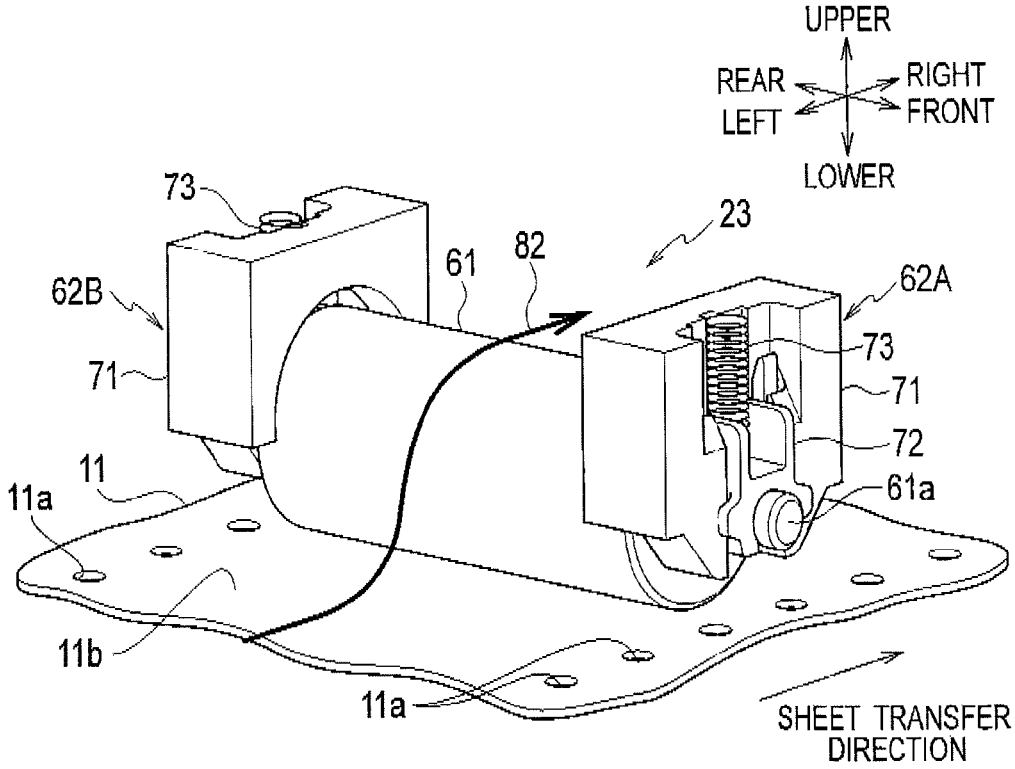

UPPER
REAR
FRONT
LOWER
32
23
61
31
32
71
62B
72
61a
71
62A
72
32a
11a
11
81
11a
61a
32a

FIG. 7


UPPER
REAR
RIGHT
LEFT
FRONT
LOWER
73
23
61
82
62B
62A
71
73
71
72
11
11a
61a
11b
11a
SHEET TRANSFER DIRECTION

PRINTER WITH TRANSFER BELT AND SHEET PRESSING ROLLER

CROSS REFERENCE TO RELATED APPLICATION

This application claims benefit of priority under 35 U.S.C. §119 to Japanese Patent Application No. 2013-132349, filed on Jun. 25, 2013, the entire contents of which are incorporated by reference herein.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a printer that performs printing on a sheet or the like.

2. Description of the Related Art

A printer that performs printing by discharging ink droplets onto a sheet from an ink head while attracting and holding the sheet on a transfer belt and transferring it, has been known.

In such a printer, if the sheet floats above the transfer belt, it might touch the ink head. If the sheet touches the ink head, the ink head might be damaged, or the sheet might be stained. Thus, a roller for preventing floating-up of the sheet by pressing the sheet onto the transfer belt is provided in some cases.

For example, in a recording device in Patent Literature 1 (Japanese Patent Application Laid-Open Publication No. 2006-137027), a guide roller is arranged on an upstream side of the sheet in a transfer direction for each of a plurality of recording heads arranged in a staggered state. This guide roller is rotatably supported by a paper-guide frame on which a paper-guide rib is provided. The sheet is guided to the guide roller while floating-up at a tip end portion thereof is suppressed by the paper-guide rib. Then, the sheet is transferred while being pressed onto a platen belt by the guide roller. As a result, contact of the sheet with the recording head is suppressed.

When an ink droplet is discharged from the ink head, an ink mist in which the ink has become a mist state occurs. The ink mist floats in the periphery of a discharge surface of the ink head. The floating ink mist might adhere to a peripheral member.

In the recording device of Patent Literature 1, the ink mist might adhere to a supporting portion of the paper-guide frame supporting the guide roller or the paper-guide rib. The ink mist does not easily adhere to the guide roller due to an influence of an air flow generated in the vicinity on the surface thereof during rotation of the guide roller.

If the ink mist adheres to the support portion or the paper-guide rib, when the sheet touches them, the ink might transfer to the sheet, and the sheet might be stained. Moreover, if the ink mist adhering to the support portion or the paper-guide rib accumulates, it becomes an ink droplet and drops onto the sheet, which might stain the sheet.

SUMMARY OF THE INVENTION

The present invention has been made in view of the above problem. An object of the present invention is to provide a printer which can reduce contact of a sheet with an ink head while a stain on the sheet is suppressed.

According to a first aspect of the present invention, there is provided a printer including: a transfer belt that has a plurality of belt holes, attracts and holds a sheet on a transfer surface, and moves so as to transfer the sheet; a sucking portion that sucks air through the plurality of belt holes to attract the sheet onto the transfer surface of the transfer belt; a printing portion that has a head row in which a plurality of ink heads each discharging an ink droplet from a discharge surface thereof faced with the transfer surface is aligned along a main scanning direction orthogonal to a transfer direction of the sheet, and a head holder for holding the plurality of the ink heads; and a sheet pressing roller that is arranged in parallel to the plurality of ink heads on a line formed by the head row and presses the sheet onto the transfer surface while rotating, wherein the sheet pressing roller is rotatably supported by a pair of support portions fixedly arranged on the head holder on one end side and the other end side of the sheet pressing roller; and the plurality of belt holes is arranged on the transfer belt so that the plurality of belt holes passes just below each support portion while the transfer belt is moving.

According to a second aspect of the present invention, a lower end of each support portion is located above the discharge surface of the ink head.

According to the first aspect of the present invention, the sheet can be pressed onto the transfer surface by the sheet pressing roller arranged in parallel to the ink heads on a line formed by the head row when the sheet passes below the discharge surface of the ink head. As a result, even if the sheet is curled, for example, contact of the sheet with the ink head can be reduced. Moreover, the belt holes of the transfer belt are arranged so that the plurality of belt holes passes just below each support portion when the transfer belt is moving. As a result, a height of a region in which the ink mist floats can be kept low just below each support portion. Thus, adhesion of the ink mist to each support portion can be suppressed. As a result, staining on the sheet by contact of the sheet with each support portion or the like can be suppressed. Moreover, since the sheet pressing roller is rotating during a printing operation, the ink mist cannot easily adhere to the sheet pressing roller. Thus, staining on the sheet by adhesion of the ink mist to the sheet pressing roller can be suppressed. Therefore, according to this aspect, contact of the sheet with the ink head can be reduced while stain on the sheet is suppressed.

According to the second aspect of the present invention, since the lower end of each support portion is located above the discharge surface of the ink head, adhesion of the ink mist to each support portion can be further suppressed. As a result, stain on the sheet can be further suppressed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an outline configuration view of a printer according to an embodiment of the present invention.

FIG. **2** is a plan view of the printer excluding a head holder according to the embodiment of the present invention.

FIG. **3** is a view illustrating a support portion of an inter-head sheet pressing portion in a state in which a lower end of a fixed portion protrudes more downward than a lower end of a movable portion according to the embodiment of the present invention.

FIG. **4** is a view illustrating the support portion of the inter-head sheet pressing portion in a state in which the lower end of the movable portion protrudes more downward than the lower end of the fixed portion according to the embodiment of the present invention.

FIG. **5** is a graph illustrating a relationship between a sucked air velocity and an ink mist floating region height according to the embodiment of the present invention.

FIG. **6** is an explanatory diagram of the ink mist just below the support portion of the inter-head sheet pressing portion according to the embodiment of the present invention.

FIG. **7** is an explanatory diagram of a flow of the ink mist in the vicinity of an inter-head guide roller according to the embodiment of the present invention.

DESCRIPTION OF THE EMBODIMENTS

An embodiment of the present invention will be described below by referring to the attached drawings. The same or equivalent portions and constituent elements throughout the drawings are given the same or equivalent reference numerals. However, the drawings are schematic, and attention should be paid that they are different from real ones. Moreover, it is needless to say that portions with a relationship or rates of dimensions different from each other are included in the drawings.

Moreover, the embodiment illustrated below exemplifies a device and the like for embodying a technical idea of this invention and the technical idea of this invention does not specify a material, a shape, a structure, arrangement and the like of each of the components to the following. The technical idea of this invention is capable of adding various changes within claims.

FIG. **1** is an outline configuration view of a printer according to the embodiment of the present invention, and FIG. **2** is a plan view of the printer excluding a head holder. In the following description, a direction orthogonal to the paper surface in FIG. **1** is referred to as a longitudinal direction, and a front direction of the paper surface is referred to as a front. Moreover, as illustrated in FIG. **1**, up, down, right, and left when seen from the front are referred to as upper, lower, right, and left directions. In FIG. **1**, a direction from left to right is a sheet transfer direction. An upstream and a downstream in the following description refer to an upstream and a downstream in the sheet transfer direction.

As illustrated in FIG. **1**, the printer **1** according to the present embodiment is provided with a transfer portion **2** and a head unit **3**.

The transfer portion **2** transfers a sheet P. The transfer portion **2** is provided with a transfer belt **11**, a driving roller **12**, driven rollers **13**, **14**, and **15**, and a sucking fan (sucking portion) **16**.

The transfer belt **11** is an annular belt extended between the driving roller **12** and the driven rollers **13** to **15**. In the transfer belt **11**, a large number of belt holes **11***a* which are through holes for attracting/holding the sheet P are formed as illustrated in FIG. **2**. The transfer belt **11** attracts/holds the sheet P on a transfer surface **11***b* by an attraction force generated in the belt holes **11***a* by driving of the sucking fan **16**. The transfer surface **11***b* is an upper surface of the transfer belt **11** which is substantially horizontal between the driving roller **12** and the driven roller **13**. The transfer belt **11** rotates/moves in a clockwise direction in FIG. **1** by driving of the driving roller **12**. As a result, the transfer belt **11** transfers the sheet P attracted/held on the transfer surface **11***b* to a right direction. The belt holes **11***a* in the transfer belt **11** are arranged so that the plurality of belt holes **11***a* continuously passes just below support portions **62**A and **62**B of an inter-head sheet pressing portion **23** which will be described later when the transfer belt **11** moves. That is, as illustrated in FIG. **2**, the plurality of belt holes **11***a* is aligned along the right-and-left direction over the entire periphery of the transfer belt **11** at positions where the support portions **62**A and **62**B are arranged in a longitudinal direction. The belt hole **11***a* may be provided at a position other than the positions illustrated in FIG. **2**

The transfer belt **11** is extended between the driving roller **12** and the driven rollers **13** to **15**. The driving roller **12** is rotated/driven by a motor, not shown, and rotates the transfer belt **11**. The driven rollers **13** to **15** are driven by the driving roller **12** via the transfer belt **11**. The driven roller **13** has substantially the same height as the driving roller **12** and is arranged on the left side of the driving roller **12**. The driven rollers **14** and **15** are arranged at substantially the same height below the driving roller **12** and the driven roller **13**, separated away from each other in a left-and-right direction.

The sucking fan **16** generates an air flow toward a lower direction. As a result, the sucking fan **16** sucks air through the belt holes **11***a* of the transfer belt **11**, generates a negative pressure in the belt holes **11***a* to attract the sheet P onto the transfer surface **11***b*. The sucking fan **16** is arranged between the driving roller **12** and the driven roller **13**.

The transfer portion **2** is configured capable of elevation by an elevation mechanism portion, not shown. As a result, a head gap Hg is made changeable. The head gap Hg is a distance between a discharge surface **32***a* of an ink head **32** which will be described later and the transfer surface **11***b* of the transfer belt **11**.

The head unit **3** performs printing on the sheet P transferred by the transfer portion **2**. The head unit **3** is arranged above the transfer portion **2**. The head unit **3** is provided with a printing portion **21**, a plurality of upstream-side sheet pressing portions **22**, and a plurality of inter-head sheet pressing portions **23**.

The printing portion **21** discharges ink droplets onto the sheet P to form an image. The printing portion **21** is provided with a head holder **31** and a plurality of ink heads **32**.

The head holder **31** is a box body for holding the ink heads **32** above the transfer surface **11***b*. The head holder **31** is fixed in the housing (not shown) of the printer **1**. On a bottom surface of the head holder **31**, a plurality of opening portions (not shown) is formed at predetermined positions. Each ink head **32** is inserted into a corresponding opening portion and fixed.

The ink head **32** discharges ink droplets. In the printer **1**, twenty-four ink heads **32** are held by the head holder **31**. The ink heads **32** are inserted into the corresponding opening portions on the bottom surface of the head holder **31**, and mounted so that lower end portions thereof protrude downward from a bottom surface of the head holder **31**. Each ink head **32** has a plurality of nozzles opened in a discharge surface (lower surface) **32***a* and discharges the ink droplets from the nozzle. The ink heads **32** are arranged in a staggered state. More specifically, eight rows (head rows **41**A, **41**B, . . . , **41**H) each composed of three ink heads **32** aligned at a predetermined pitch along a longitudinal direction (main scanning direction), are arranged at equal intervals in the left-and-right direction. The head rows **41**A to **41**H are arranged with positions in the longitudinal direction shifted every other rows only by a half pitch. The head rows **41**A to **41**H constitute a line head for one color by two adjacent rows. For example, the head rows **41**A and **41**B discharge the ink in black, the head rows **41**C and **41**D discharge the ink in cyan, the head rows **41**E and **41**F discharge the ink in magenta, and the head rows **41**G and **41**H discharge the ink in yellow. A length in the longitudinal direction of a region in which the ink heads **32** are arranged is substantially the same as a length of the transfer surface **11***b* in the longitudinal directions (width of the transfer belt **11**). A length in the left-and-right direction of the region in which the ink heads are arranged is shorter than the length in the left-and-right direction of the transfer surface **11***b*.

The alphabetical suffixes in reference characters of the head rows **41**A to **41**H are omitted and noted collectively in some cases.

Each upstream-side sheet pressing portion **22** is to press the transferred sheet P onto the transfer surface **11***b* of the transfer belt **11** on an upstream side of each of the head rows **41**. The eight upstream-side pressing portions **22** are arranged on the upstream sides of the head rows **41**A to **41**H, respectively. Each upstream-side sheet pressing portion **22** is provided with an upstream-side guide roller **51** and a pair of support portions **52**A and **52**B.

The upstream-side guide roller **51** presses the sheet P onto the transfer surface **11***b* while rotating. The upstream-side guide roller **51** is formed having a columnar shape elongated in the longitudinal direction. The upstream-side guide roller **51** extends over the entire width of the transfer belt **11** on the upstream side of each of the head rows **41**. The upstream-side guide roller **51** is in contact with the transfer belt **11** and follows and rotates with the transfer belt **11**. A surface of the upstream-side guide roller **51** is applied with ink repellant treatment such as fluorine resin coating.

The pair of support portions **52**A and **52**B rotatably support the upstream-side guide roller **51**. The support portions **52**A and **52**B are fixed to a lower surface of the head holder **31**. The support portions **52**A and **52**B are arranged on a front end side and a rear end side of the upstream-side guide roller **51**, respectively, and rotatably support a front end portion and a rear end portion of a rotating shaft of the upstream-side guide roller **51**, respectively. The support portions **52**A and **52**B are arranged outside of a region in which the ink heads **32** are arranged in the longitudinal direction. For the support portions **52**A and **52**B, a configuration similar to those of the support portions **62**A and **62**B of the inter-head sheet pressing portion **23** which will be described later can be employed, for example.

The inter-head sheet pressing portion **23** is to press the transferred sheet P onto the transfer surface **11***b* of the transfer belt **11** on a line formed by each of the head rows **41**. The twenty-four inter-head sheet pressing portion **23** is arranged in a staggered state opposite to that of the ink heads **32**. That is, each of the inter-head sheet pressing portions **23** is arranged in parallel to each of the ink heads **32** on the line formed by each of the head rows **41**. The inter-head sheet pressing portion **23** is provided with an inter-head guide roller (sheet pressing roller) **61** and a pair of the support portions **62**A and **62**B.

The inter-head guide roller **61** presses the sheet P onto the transfer surface **11***b* while rotating. The inter-head guide roller **61** is formed having a columnar shape elongated in the longitudinal direction. The length of the inter-head guide roller **61** is slightly shorter than a gap between the ink heads in each of the head rows **41**. The inter-head guide roller **61** is in contact with the transfer belt **11** and follows and rotates with the transfer belt **11**. The surface of the inter-head guide roller **61** is applied with ink repellant treatment such as fluorine resin coating.

The pair of support portions **62**A and **62**B rotatably supports the inter-head guide roller **61** above the transfer surface **11***b*. The support portions **62**A and **62**B are fixed to the lower surface of the head holder **31**. The support portions **62**A and **62**B are arranged on a front end side and a rear end side of the inter-head guide roller **61**, respectively, and rotatably support a front end portion and a rear end portion of a rotating shaft of the inter-head guide roller **61**, respectively.

As illustrated in FIG. **3**, the support portion **62**A is provided with a fixed portion **71**, a movable portion **72**, and a spring **73**. The support portion **62**B also has a configuration similar to that of the support portion **62**A.

The fixed portion **71** guides vertical movement of the movable portion **72**. The fixed portion **71** is fixed to the lower surface of the head holder **31**. The fixed portion **71** has a guide groove **71***a* for guiding the movable portion **72**. The guide groove **71***a* is formed in parallel in a vertical direction.

The movable portion **72** supports the inter-head guide roller **61** rotatably and capable of vertical movement. The rotating shaft **61***a* of the inter-head guide roller **61** is rotatably connected to the movable portion **72**. The movable portion **72** is made capable of vertical movement along the guide groove **71***a* of the fixed portion **71**. As a result, the movable portion **72** vertically moves in accordance with a change of the head gap Hg, and the inter-head guide roller **61** is vertically moved with that.

The spring **73** gives an elastic force to the movable portion **72**. The inter-head guide roller **61** is pressed onto the transfer belt **11** by means of the elastic force of the spring **73**. An upper end of the spring **73** is fixed to the lower surface of the head holder **31**. A lower end of the spring **73** is fixed to the movable portion **72**.

Here, as described above, in the transfer belt **11**, the belt holes **11***a* are arranged so that the plurality of belt holes **11***a* continuously passes just below the support portions **62**A and **62**B when the transfer belt **11** is moving. That is, the support portions **62**A and **62**B are arranged immediately above the positions where the belt holes **11***a* pass.

Moreover, lower ends of the support portions **62**A and **62**B are located above the discharge surface **32***a* of the ink head **32**. That is, a support portion lower-end height He is larger than the head gap Hg.

The support portion lower-end height He is a height from the transfer surface **11***b* to the lower end of the fixed portion **71**. However, when the head gap Hg is relatively large, the lower end of the movable portion **72** protrudes downward from the lower end of the fixed portion **71** in some cases. In this case, as illustrated in FIG. **4**, a height from the transfer surface **11***b* to the lower end of the movable portion **72** becomes the support portion lower-end height He. The support portion lower-end height He is set larger than the head gap Hg all the time within a fluctuation range of a size of the head gap Hg set in the printer **1**.

Moreover, the support portion lower-end height He is preferably larger than an ink mist floating-area height Hm. The ink mist floating-region height Hm is a height from the transfer surface **11***b* of a region in which an ink mist **81** floats during a printing operation in the printer **1**.

As illustrated in FIG. **5**, the smaller a sucked air velocity by the sucking fan **16** is, the higher the ink mist floats up. The ink mist floating-area height Hm is an ink mist floating-area height at an appropriate lower-limit air velocity V1 which is a lower limit of an appropriate range V1 to V2 of the sucked air velocity in the printer **1**.

Here, if the sucked air velocity by the sucking fan **16** is too high, the ink mist increases and hits the sheet P, whereby the sheet P might be stained. On the other hand, if the sucked air velocity is too low, an attraction force of the sheet P to the transfer surface **11***b* is insufficient, and defective transfer might be caused. Thus, in the printer **1**, as illustrated in FIG. **5**, an appropriate range of the sucked air velocity is set.

Subsequently, an operation of the printer **1** will be described.

When a printing operation is started in the printer **1**, driving of the driving roller **12** of the transfer portion **2** and the sucking fan **16** is started.

The driving roller **12** rotates and moves the transfer belt **11** in a clockwise direction in FIG. **1**. Moreover, the sucking fan **16** sucks air through the belt holes **11***a* of the transfer belt **11**. As a result, a negative pressure is generated in the belt holes **11**, and an attraction force is generated.

When the sheet P is fed from a paper feed portion, not shown, the transfer portion **2** attracts and transfers the sheet P onto the transfer surface **11***b* by the attraction force generated in the belt holes **11***a*. Here, the sheet P is pressed onto the transfer surface **11***b* by the upstream-side guide roller **51** and the inter-head guide roller **61** and transferred.

Then, the ink head **32** discharges the ink droplets onto the transferred sheet P to print an image.

When the ink droplets are discharged from the ink head **32**, a part of them becomes a mist-state ink mist. The ink mist floats above the transfer surface **11***b*.

Here, during the printing operation, the belt holes **11***a* pass just below the support portions **62**A and **62**B. When the sheet P attracted onto the transfer surface **11***b* passes below the support portions **62**A and **62**B, the belt holes **11***a* are closed by the sheet P. On the other hand, between the continuously transferred sheets P, the open belt holes **11***a* pass just below the support portions **62**A and **62**B. At this time, the ink mist floating above the transfer surface **11***b* is sucked downward through the belt holes **11***a*. Therefore, just below the support portions **62**A and **62**B, the ink mist is sucked through the belt holes **11***a* between sheets coming at a predetermined interval.

As a result, as illustrated in FIG. **6**, just below the support portions **62**A and **62**B, the height of the region in which the ink mist **81** floats is kept low. Thus, adhesion of the ink mist **81** to the support portions **62**A and **62**B is suppressed.

Moreover, as described above, the support portion lower-end height He is larger than the head gap Hg. The ink mist might float above the discharge surface **32***a* but tends to float more between the discharge surface **32***a* and the transfer surface **11***b*. Moreover, the height of the region in which the ink mist floats is kept low just below the support portions **62**A and **62**B by means of above described sucking of the ink mist. Thus, since the support portion lower-end height He is larger than the head gap Hg, that is, since the lower ends of the support portions **62**A and **62**B are located above the discharge surface **32***a*, adhesion of the ink mist to the support portions **62**A and **62**B is further suppressed. Moreover, by setting the support portion lower-end height He larger than the ink mist floating-region height Hm, adhesion of the ink mist **81** to the support portions **62**A and **62**B can be further suppressed.

Moreover, during the above described printing operation, the inter-head guide roller **61** follows and rotates with the transfer belt **11**. An air flow caused by rotation is generated in the vicinity of the surface of the inter-head guide roller **61**. The ink mist flows upward along the inter-head guide roller **61** by means of this air flow, as illustrated by a bold arrow **82** in FIG. **7**. Due to this phenomenon, the ink mist does not easily adhere to the inter-head guide roller **61**. Moreover, the surface of the inter-head guide roller **61** is applied with the ink repellant treatment, which also makes adhesion of the ink mist difficult.

Because of the reason similar to the difficulty in adhesion of the ink mist to the inter-head guide roller **61**, the ink mist does not easily adhere to the upstream-side guide roller **51** of the upstream-side sheet pressing portion **22**, either. Moreover, since the support portions **52**A and **52**B of the upstream-side sheet pressing portion **22** are arranged outside the region in which the ink heads **32** are arranged, the ink mist does not adhere easily.

As described above, though the ink mist is generated during the printing operation in the printer **1**, the ink mist does not adhere easily to each of the upstream-side sheet pressing portion **22** and the inter-head sheet pressing portion **23**. As a result, the sheet P is being transferred and printed while adhesion of stains is suppressed.

Regarding those not sandwiched by the ink heads **32** in the longitudinal direction among the twenty-four inter-head sheet pressing portions **23**, the support portion **62**A or **62**B may be arranged outside the region in which the ink heads **32** are arranged. For example, the support portion **62**A of the inter-head sheet pressing portion **23** on the frontmost side on the line formed by the head row **41**A may be arranged at a position similar to that of the support portion **52**A of the upstream-side sheet pressing portion **22** in the longitudinal direction. In this case, it is only necessary that the inter-head guide roller **61** is made longer than the other inter-head sheet pressing portions **23**.

As described above, the printer **1** has the inter-head guide roller **61** arranged in parallel to the ink heads **32** on the line formed by each of the head rows **41**. As a result, when the sheet P passes below the discharge surface **32***a* of the ink head **32**, the sheet P can be pressed onto the transfer surface **11***b* by the inter-head guide roller **61**. As a result, even if the sheet P is curled, for example, contact of the sheet P with the ink head **32** can be reduced.

Moreover, in the printer **1**, the belt holes **11***a* are arranged so that the plurality of belt holes **11***a* passes just below the support portions **62**A and **62**B when the transfer belt **11** is moving. As a result, the height of the region in which the ink mist floats just below the support portions **62**A and **62**B can be kept low. Thus, adhesion of the ink mist to the support portions **62**A and **62**B can be suppressed. Therefore, even if the sheet P is brought into contact with the support portions **62**A and **62**B, stains on the sheet P can be suppressed. Moreover, the ink mist accumulated on the support portions **62**A and **62**B is prevented from becoming ink droplets and dropping onto the sheet P to stain it.

Moreover, since the inter-head guide roller **61** is rotating during the printing operation, the ink mist does not easily adhere to the inter-head guide roller **61**. Thus, stains on the sheet P caused by adhesion of the ink mist to the inter-head guide roller **61** is suppressed.

Therefore, according to the printer **1**, contact of the sheet P with the ink head **32** can be reduced while stains on the sheet P are suppressed.

Moreover, according to the printer **1**, since the lower ends of the support portions **62**A and **62**B are located above the discharge surface **32***a*, adhesion of the ink mist onto the support portions **62**A and **62**B can be further suppressed. As a result, stains on the sheet P can be further suppressed.

The present invention is not limited to the above described embodiment but can be embodied by varying the constituent elements within a range not departing from the gist thereof in the practical stage. Moreover, various inventions can be formed by appropriately combining a plurality of the constituent elements disclosed in the above described embodiment. For example, some constituent elements may be deleted from all the constituent elements illustrated in the embodiment.

What is claimed is:

1. A printer comprising:

a transfer belt that has a plurality of belt holes, attracts and holds a sheet on a transfer surface, and moves to transfer the sheet;

a suction device that sucks air through the plurality of belt holes to attract the sheet onto the transfer surface of the transfer belt;

a printer that has a head row in which a plurality of ink heads, each discharging an ink droplet from a discharge surface thereof facing the transfer surface is aligned along a main scanning direction orthogonal to a transfer

direction of the sheet, and a head holder that holds the plurality of the ink heads; and

a sheet pressing roller that is arranged in parallel to the plurality of ink heads on a line formed by the head row, the sheet pressing roller presses the sheet onto the transfer surface while rotating, wherein

the sheet pressing roller is a supported by a pair of support portions fixedly arranged on the head holder on one end side and the other end side of the sheet pressing roller; and

the plurality of belt holes is arranged on the transfer belt so that each of the plurality of belt holes are positioned directly below one of the support portions, while the transfer belt is moving.

2. The printer according to claim **1**, wherein

a lower end of each support portion is located above the discharge surface of the ink head.

3. The printer according to claim **1**, a distance between the transfer surface and a lowermost portion of the support portion is larger than a height of an ink mist floating region.

4. The printer according to claim **1**, wherein the belt holes are arranged in pairs of rows extending along the sheet transport direction, and rows of a row pair are spaced by a distance corresponding to a length of the sheet pressing roller.

5. A printer comprising:

a transfer belt that has a plurality of belt holes, attracts and holds a sheet on a transfer surface, and moves to transfer the sheet;

a suction device that sucks air through the plurality of belt holes to attract the sheet onto the transfer surface of the transfer belt;

a printer that has a head row in which a plurality of ink heads, each discharging an ink droplet from a discharge surface thereof facing the transfer surface is aligned along a main scanning direction orthogonal to a transfer direction of the sheet, and a head holder that holds the plurality of the ink heads; and

a sheet pressing roller that is arranged in parallel to the plurality of ink heads on a line formed by the head row, the sheet pressing roller presses the sheet onto the transfer surface while rotating, wherein

the sheet pressing roller is rotatably supported by a pair of support portions fixedly arranged on the head holder on one end side and the other end side of the sheet pressing roller; and

the plurality of belt holes is arranged on the transfer belt only in a pair of rows extending along the sheet transport direction and passing directly below the pair of support portions.

6. The printer according to claim **5**, wherein a lower end of each support portion is located above the discharge surface of the ink head.

7. The printer according to claim **5**, wherein a distance between the transfer surface and a lowermost portion of the support portion is larger than a height of an ink mist floating region.

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